

Effect of different doses of fertilizers on arecanut (*Areca catechu*) varieties under sub himalayan terai region of West Bengal

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Arecanut (*Areca catechu* L.) is an important plantation crop grown in India. Northern parts of West Bengal share a good quantity of total arecanut production. Different types of arecanut are being grown in this region. Once it is planted, one can expect yield for a long period. Supply of nutrients helps to get good harvest in each and every year. Fertilizer is the most important and costly input to enhance yields (Baloch *et al.* 2004). Rawther and Abraham (1974) reported that yields were greatly enhanced by NPK along with irrigation in arecanut. The farming community has limited idea about the fertilizer application on arecanut. There is no specific fertilizer dose on arecanut in this region. The manurial experiment was first started by Coleman and Rao (1918). After that different types of experiments on fertilizer requirement (Iyengar 1954, Sujatha *et al.* 1999) were conducted by many workers for south Indian condition. Fertilizer requirement varied from variety to variety and region to region in same crops. So far there is no specific fertilizer recommendation for arecanut for this region. Considering the importance of fertilizer application, an experiment was conducted during 1995–2005 at the regional centre of CPCRI, Mohitnagar to find out the actual dose of fertilizer requirement for four released arecanut varieties in sub Himalayan terai region of West Bengal for better performance.

Four improved arecanut varieties, viz 'Mangala' (V1), 'Sumangala' (V2), 'Sreemangala' (V3) and 'Mohitnagar' (V4) were planted at Mohitnagar during 1993 at a spacing of 2.7 m × 2.7 m. Five level of fertilizer doses, viz no fertilizer, half of the recommended fertilizer, recommended fertilizer, one and half of the recommended fertilizer and double of the recommended fertilizer were applied for four arecanut varieties from the planting. An average of 20 kg farmyard manure/palm/year was applied along with chemical fertilizer. Fertilizer was applied in the form of urea for nitrogen, rock phosphate for phosphorus and muriate of potash for potash. The fertilizer was applied in 2 equal split doses once during onset

of monsoon and the other after monsoon. The experiment was laid out in a strip-plot design with 4 replications. The soil was predominantly sandy loam soil with a pH of 5.5. The maximum and minimum temperature ranged between 10 (January) to 36° C (May). The area experienced an annual rainfall of more than 3000 mm. Each treatment consisted of 6 palms. The palms were irrigated during dry spell in March–May. Data was recorded on 6 palms of each treatment. Yield and yield attributing characters, like number inflorescence, number of productive inflorescence, number of nuts, length and width of fresh nuts and kernel, weight of fresh and dry kernel, volume of fresh nuts and chali yield per palm per year was recorded. Three years average data (2003–2005) were analyzed and discussed.

The yield and yield attributing characters of 4 arecanut varieties responded in different doses of fertilizer (Table 1). Almost all the varieties showed significant difference in almost all characters at different fertilizer doses with significant interaction effect between varieties and different fertilizer doses. In case of production of inflorescence and productive inflorescence, it was found that maximum number of inflorescence (4.13) was by 'Sreemangala' at recommended doses of fertilizer but the productive inflorescence was very less (1.81), followed by 'Mohitnagar' (4.12) at same dose of fertilizer. In case of inflorescence production, different fertilizer doses had significant effect. In all the varieties, at no fertilizer dose, there is production of inflorescence but it was minimum compared with the treatments where fertilizer was applied. Retention of inflorescence (productive inflorescence) was more in 'Mohitnagar' than the other varieties. Significant difference was observed among the varieties and fertilizer doses and there was interaction effect between variety and doses of fertilizers. In case of nut production, it was observed that with increase of fertilizer doses, there was increase of nut production/palm up to a certain level. In case of 'Mangala' and 'Mohitnagar', the maximum nut production (254.27 and 377.33 respectively) was observed at recommended dose fertilizer, whereas in case of 'Sumangala' and 'Sreemangala' it was at one and half dose of recommended fertilizer and half of the

*Short note

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Table 1 Yield and yield attributing characters of different arecanut varieties at different level of fertilizer dose

Treatment	No. of inflo.	Number of prod. inflorescence	Nuts/palm	Length of nuts (cm)	Breadth of nuts (cm)	Fresh weight of nuts (g)	Vol nut (ml)	Kernel length (cm)	Kernel width (cm)	Fresh kernel weight (g)	Dry kernel Wt (g)	Fresh husk weight (g)	Dry husk weight (g)	Chali yield (kg/palm/year)
V1T0	3.17	1.94	123.67	5.08	4.13	40.00	51.38	2.53	2.9	13.567	6.90	26.43	6.37	0.861
V1T1	3.86	2.33	155.87	5.14	4.14	42.73	51.73	2.44	3.05	13.900	7.87	28.84	5.83	1.249
V1T2	3.83	2.59	254.27	5.4	4.42	48.00	55.47	2.46	3.03	15.833	8.43	32.17	5.70	2.196
V1T3	3.87	1.78	139.80	5.68	4.38	45.17	50.83	2.55	2.85	15.470	7.90	29.7	6.60	1.101
V1T4	3.81	2.52	197.77	5.84	4.32	50.13	58.57	2.7	2.92	15.767	8.20	34.37	7.13	1.659
V2T0	2.61	1.40	086.70	5.30	4.16	45.73	49.70	2.54	2.66	10.867	6.10	34.87	7.10	0.527
V2T1	3.97	2.43	186.60	5.55	4.34	45.67	52.10	2.62	2.87	12.900	8.07	32.77	7.17	1.504
V2T2	4.02	2.63	162.33	5.62	4.03	38.33	46.87	2.62	2.84	13.367	7.50	24.97	5.30	1.209
V2T3	3.95	2.32	211.77	5.45	4.34	51.40	54.33	2.58	2.84	12.667	8.07	38.83	7.03	1.677
V2T4	3.94	2.26	149.00	4.50	3.72	40.03	36.97	2.51	2.37	09.900	7.00	30.13	5.90	1.045
V3T0	3.3	1.67	070.90	5.39	4.31	43.83	51.03	2.61	2.95	11.767	8.47	32.07	7.00	0.593
V3T1	3.98	2.56	185.67	5.65	3.78	40.27	41.97	3.0	2.48	15.433	8.57	24.83	5.83	1.573
V3T2	4.13	1.81	101.57	6.14	4.21	45.90	45.03	2.69	2.91	17.433	8.77	28.47	6.87	0.848
V3T3	3.91	1.57	078.20	5.58	4.05	41.60	51.30	2.94	2.9	16.600	9.40	25.03	5.93	0.703
V3T4	3.65	1.56	112.00	5.30	4.04	39.90	48.00	2.55	2.68	13.500	7.60	26.40	6.47	0.915
V4T0	3.45	2.45	125.70	5.39	4.36	50.63	57.97	2.64	2.85	14.800	8.83	35.83	7.53	1.040
V4T1	3.99	2.41	248.70	5.65	4.54	54.57	63.57	2.71	2.94	15.230	9.27	39.33	8.30	2.254
V4T2	4.12	2.88	377.33	6.14	4.33	59.33	55.67	2.80	3.37	16.500	9.93	42.83	7.83	3.747
V4T3	4.07	2.66	343.80	5.58	4.29	54.67	52.37	2.87	2.97	16.000	9.70	38.67	6.63	3.005
V1T4	3.78	2.62	249.00	5.30	4.54	53.60	64.90	2.9	2.92	15.500	8.40	38.10	7.73	2.060
CD-V	0.910	0.565*	205.72*	0.738*	0.411*	13.31*	12.41*	0.541	0.455*	5.0051*	2.842*	10.32*	1.85*	2.197*
CD-F	0.680*	0.580*	097.91*	0.347*	0.517	11.90	12.12	0.543	0.217*	2.4631*	1.126*	09.85	2.11	0.784*
CD VxV	0.173	0.580*	095.85*	0.392*	0.527	0 8.93	14.59	0.279	0.302*	3.2489	0.775*	07.16*	1.72	0.855*
CV-V	12.09	12.80	57.84	6.66	4.88	14.31	11.95	10.90	7.97	17.460	17.240	16.02	13.80	73.90
CV-F	09.93	14.12	29.21	3.32	6.50	13.56	12.38	10.20	4.04	09.118	07.252	16.23	16.77	27.99
CV-VxV	07.93	15.60	31.95	4.20	7.40	11.37	16.65	06.19	6.25	13.440	05.574	13.19	15.26	34.12

V1- Mangala, V2-Sumangala, V3-Sreemangala, V4-Mohinagar, T₀-no fertilizer, T₁- half of the recommended fertilizer, T₂- full dose of recommended fertilizer, T₃-one and half of recommended fertilizer and T₄-double of the recommended fertilizer

recommended fertilizer dose, respectively. All the varieties differed significantly in all doses of fertilizer in case of fresh and dry kernel weight. There was interaction of all the varieties in all doses of fertilizer in case of dry kernel weight, whereas significant difference was observed among the varieties in case of fresh nut weight. All the varieties varied significantly in case of volume of nut, whereas there was no significant differences in fertilizer and interaction on the same parameter. Kernel length did not differ significantly among the varieties and different fertilizer doses, whereas kernel breadth and dry kernel weight varied significantly among the varieties, fertilizer dose and significant interaction effect on kernel width was noticed. In case of *chali* yield, all the varieties and different doses of fertilizer differed significantly. The *chali* production/palm/year, followed the trend of nut production/palm/year. *Chali* production was increased with the increase of fertilizer dose up to a certain level, then there was gradual decrease of *chali* production with the increase of fertilizer dose. Maximum *chali* production (3.747 kg/palm/year) was recorded by 'Mohitnagar' at recommended doses of fertilizer, followed by 'Mangala' (2.196kg) on same level and 'Sumangala' (1.677 kg) and 'Sreemangala' (1.573 kg) at one and half dose of recommended fertilizer and half of the recommended fertilizer, respectively. There was significant interaction effect between variety and fertilizer in this parameter.

Thus it can be concluded that different varieties responded well to different level of fertilizers. For 'Mohitnagar' and 'Mangala' varieties, full dose of fertilizer (100:40:140 as N:P:K respectively) and for 'Sumangala' and 'Sreemangala' one and half of recommended fertilizer (150:60:210 as N:P:K, respectively) and half of the recommended fertilizer dose (50:20:70 as N:P:K, respectively) respectively is required to obtain maximum *chali* yield/palm/year under sub Himalayan terai region of West Bengal.

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SUMMARY

An experiment was conducted during 1995–2005 to study the response of different arecanut (*Areca catechu* L.) varieties to different fertilizer levels under sub Himalayan terai region of West Bengal. All the varieties significantly varied in almost all the fertilizer levels: 'Mohitnagar' and 'Mangala' varieties gave maximum dry arecanut *chali* at recommended dose of fertilizer and 'Sumangala' and 'Sreemangala' gave maximum dry arecanut at one and half and half of the recommended fertilizer dose respectively. The dry arecanut yield was more in 'Mohitnagar' and 'Mangala' than the other two varieties 'Sumangala' and 'Sreemangala'. Comparatively less dry arecanut yield was recorded where fertilizer was not applied.

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